anago

ensure optimum sharpness

OPERATING MANUAL

ANAGO Knife Sharpness Tester (KST) Series

KST200e Standard
KST300e Standard

Version 5.0
April 2021

WARRANTY INFORMATION

Anago warrants that the products supplied are fit for purpose and free from defects for a period of twelve (12) months from the date of delivery.

All other guarantees, warranties and representations in relation to the products or their supply implied by law or otherwise are excluded except to the extent that Anago cannot lawfully exclude them.

Anago will not be liable, whether pursuant to this warranty or otherwise;

a. For any direct or indirect consequential loss (including loss of business or profits) incurred by the customer, as a result of breach of the warranty or any defect in the product;
b. For fair wear and tear or wilful or accidental damage to the product;
c. For any damage cause by abnormal use or failure to properly maintain or service the product.

Anago's liability to the customer, whether pursuant to this warranty or otherwise, is limited to the value of the product and Anago may, at its option, either:

a. Repair any defective product; or
b. Replace any defective product; or
c. Pay to the customer the price the customer paid to Anago for the product.

Anago will not have any liability to the customer, whether pursuant to this warranty or otherwise, or any defect in the product or other claim unless:

a. The customer notifies Anago of the defect or claim within 14 days of the customer becoming aware of the defect or claim; and
b. The customer allows Anago to fully investigate the defect or claim.

DO NOT RETURN THIS PAGE TO ANAGO

Please fill in the fields below and retain with your purchase documentation for reference purposes.

Model No. _____

Serial No. _____

Date of Purchase _____

FOR ALL PRODUCT AND WARRANTY ENQUIRIES

EMAIL SUPPORT@ANAGO.CO.NZ

CONTENTS

FREQUENTLY ASKED QUESTIONS

How do I set up the Knife Sharpness Tester?

- We supply a laminated A3 Quick Start Guide with pictures and simple-to-follow instructions. Follow this guide for initial setup.
- We recommend establishing an in-house Anago Champion. This person can be trained at the commissioning session and becomes a key contact for our Service Technician.

How do I get the best results from our knife testing?

- Each test will provide an immediate visual result on the sharpness of the knife.
- Connect the KST to a PC with the included PC software, this will allow you to save the test data for further analysis.
- Most sites choose to use Anago Analytics that allows individuals/ shifts/ plants the ability to develop a more in depth understanding of how knife sharpness is progressing corresponding to productivity/safety intentions within the organization.

What is included with my Sharpness Tester?

- Knife Sharpness Tester
- Operating Manual
- USB Cable
- Power Cable
- Quick Start Guide
- Calibration Mass
- USB flash drive (with included software and manuals)
- Access to Service Support line.
- 1-year warranty against any manufacturing defects.

What are the ongoing operational costs?

- Anago Test Media consumable is required to run tests. One box of Test Media (5 rolls) will run approximately 625 tests, depending on knife length (approx. 125 tests per roll).
- Anago's optional online Analytics has a monthly subscription cost per site.
- For US-based customers, we recommend an annual ½ day onsite visit from our Service Technician (flat rate of USD$500, plus travel costs, plus any parts not covered by warranty).
- Anago genuine Test Media will ensure your machine runs efficiently and can be purchased from sales@anago.co.nz.

Who do I talk to when I have a problem?

- We have a dedicated support line directly to the engineers. This can be done through email (support@anago.co.nz) or by skype/ phone 352-397 2858.
- For US-based customers, we also have our service technician based in Missouri for site visits. He can spend time with your Anago Champions, diagnosing issues, completing service work and helping to train employees in sharpness management.
- Check out our YouTube channel for frequently requested video tutorials

Can I get a Technician to visit?

- Please contact our support team at support@anago.co.nz to see if there is an available technician in your area.

1. INTRODUCTION

Thank you for buying an Anago Knife Sharpness Tester.

You now own the world's best system for accurately, objectively and repeatedly testing and auditing blade sharpness.

Sharp blades can be dangerous when handled without cut-resistant or cut-proof gloves.

With the Anago KST200e and KST300e series of sharpness analyzers you can now;

- Test and record the sharpness of blades
- Evaluate edge life
- Analyze and compare blade sharpness between people, departments and facilities
- Graph sharpness results in an easy-to-read format
- Export sharpness test results
- Control the quality of sharpness at your facility

1.1. Anago Limited

Anago Limited is a technology company based in Hamilton, New Zealand. Established in 2001, Anago specializes in products that improve safety and production performance, primarily in the food processing industry. Anago invented and commercialized the world's leading knife sharpness testing technology.

Anago Knife Sharpness Testers (KST's) have been instrumental in the improvement of knife sharpness levels and the optimization of sharpening methods throughout the United States, Australasia, and Europe. Within food processing companies, these improvements have directly resulted in increases in production yield and output as well as reduced musculoskeletal disorders amongst workers.

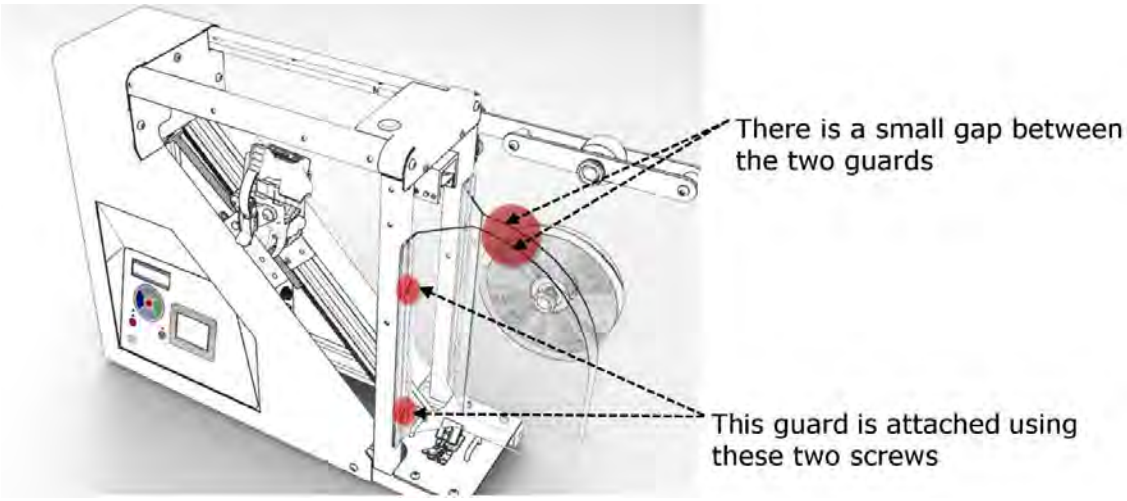
Anago also provides customised sharpness testing technology and consulting services to specialist blade manufacturers (including the medical industry), processors and researchers.

Anago knife and blade sharpness testing technology is represented and serviced globally by Anago direct and through a distributor and service agent network. Please contact Anago to find your nearest representative.

1.2. Safety

IMPORTANT

It is **highly recommended** that the operator **wears appropriate cut-resistant or chain mail gloves** when loading and unloading blades into the Anago KST.



Keep the guard screen installed securely during use. At all times, ensure care is taken when handling blades.

2. INITIAL SETUP

2.1. Software Installation

- Ensure you are logged on with a username that has administrator privileges. This must be done before new programs can be installed
- Plug the provided Anago USB flash drive into a USB port on the PC / Laptop
- The setup program should run automatically. If it doesn't, navigate to the Anago KST Setup.exe file. Right-click and choose "Run as administrator"
- Follow all prompts from the installation guide
- After Installation, select the program from the Start Menu: AnagoSharp
- You will be prompted to install a license – this is the license.xml file on the supplied USB. If you already own a KST, fill out the information to receive a license

2.2. Test Media

The Anago KST comes with **ST-TM-5 Sharpness Test Media** already loaded.

To ensure the best results, always operate your KST with genuine Anago test media. Other counterfeit brands have been shown to cause inconsistencies and errors while tensioning, leading to less accurate results. All purchase orders should go through sales@anago.co.nz.

Name: Anago Sharpness Test Media (box of 5 rolls)

Part Code: ST-TM-5

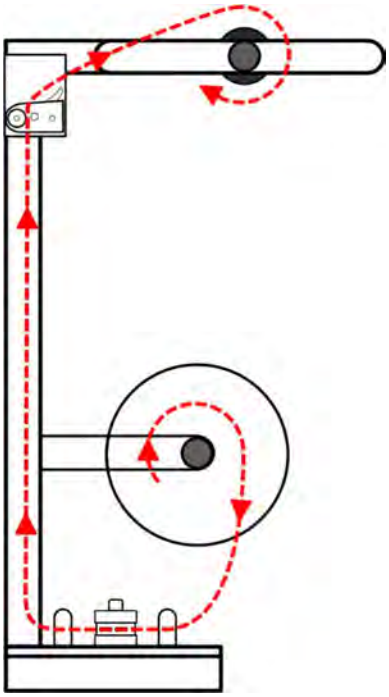
2.2.1. *Removing the used roll of test media*

- Remove the top and bottom brackets
- Release the top self-locking clamp, remove the used test media and the black media core
- Remove the used fabric from the core. The core can now be reused

2.2.2. *Loading the new roll of test media*

- Take out the new test media roll and unwind about a meter of test media (sufficient that it can be thread from bottom to top)
- Thread the new media through as shown in red
- At the top, insert the media into the perpendicular slot in the black media core
- Re-attach the top and bottom brackets

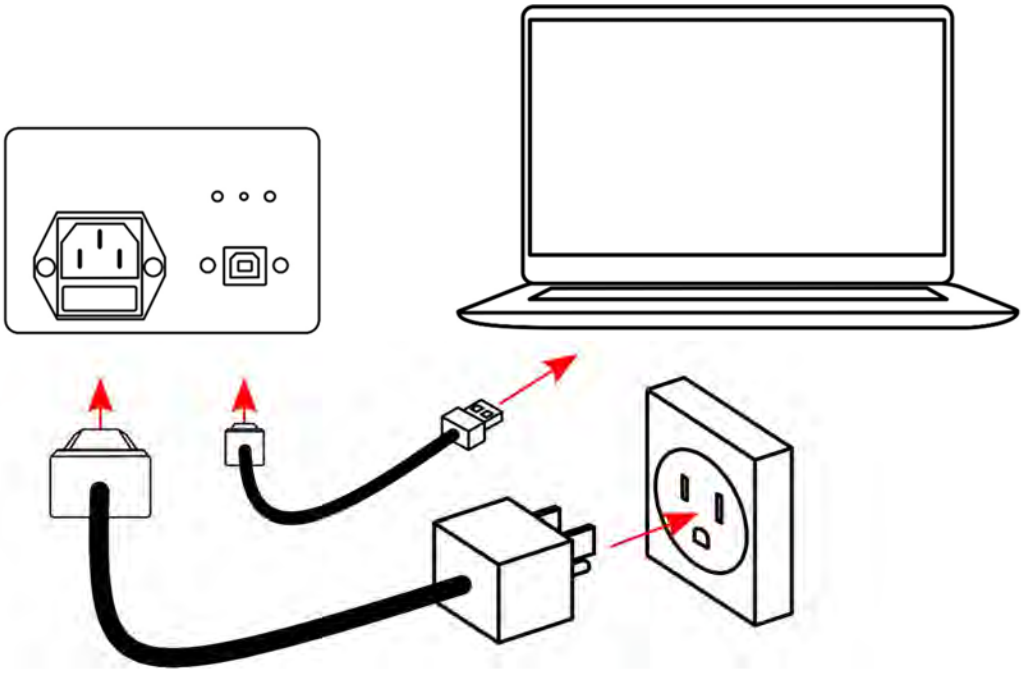
Ensure the media is loaded in a clockwise direction on the top roller.



2.3. Connecting to a PC or Laptop

Connect the KST as follows:

- USB (Type A) male into an available USB port on the laptop / PC
- USB (Type B) male into the USB port on the side of the KST



2.4. Operating Modes

The Anago KST has two operating modes: PC-Control mode and Local mode. These modes have different functions to fulfil different requirements.

2.4.1. *Switching between PC-Control and Local Modes*

Press the **PC CONTROL** 

button on the keypad to switch between operating modes.

The PC-Control indicator will light up when the KST is in PC Control Mode.

When in Local (Manual) Mode:

- The KST will **not respond** to any motion commands from an attached PC / Laptop.
- All motion control (including running a test) will need to be performed on the keypad
- The KST will calculate the score locally and display the results on the LED display screen
- The LCD display will show “Manual” at the bottom right hand corner

When in **PC-Control** Mode:

- The KST **can be controlled** by an attached PC / Laptop, or by the keypad
- The KST will not calculate or display the score locally

- Test results will be transferred to the connected PC
- The LCD display will show “PC-Ctrl” at the bottom right hand corner

2.5. Calibration

2.5.1. *Load Cell Calibration*

The calibration process requires the use of the standard 2kg calibration mass shipped with the Anago KST.

Calibration

Calibration is performed by Anago prior to shipment; however, **we recommend recalibrating:**

- Before using the KST for the first time
- Every 1 to 2 weeks during normal operations
- Whenever the KST200e/300e may have suffered significant vibration (e.g. during transport or from a knock)
- After particularly blunt knives have been tested

Setting Calibration

- Turn the KST on using the **Power** button
- Ensure the guards are closed
- Press **Setup** 

on the keypad
- Check that the LCD screen displays ‘**Setup Menu**’
- Press **Down** until the  screen displays ‘**Calibration**’
- Press **Run**  to select ‘OK’ and enter into the calibration sub-menu
- Ensure the test media is loose and with the screen displaying ’**Zero Load**’ press the **Run**  button to save the new “Zero Load” calibration setting
- With the screen displaying ‘**2kg Load**’, hang the calibration mass onto the test media

- Press the **Run**  button to save the new 2kg load calibration setting.
- Remove the 2kg calibration mass and close the guards
- Press **Setup**  button to exit the setup mode

Your KST is now calibrated and ready for sharpness testing.

2.5.2. *Setting Knife Limits*

The top and bottom limits control the start and end positions the blade clamp will reach during a test. This allows for different portions of a knife or different length knives to be tested for sharpness.

- Clamp the blade to be tested into the Anago KST. Doing this will give you an indication of where the initial and final positions of the blade clamp should be relative to the length of the blade which is to be tested
- Close the guards. Using the **Down**  button on the keypad, lower the blade until the tip is about to touch the test media
- Press the **Setup**  button on the keypad
- Check the LCD screen displays '**Setup Menu**'
- Press the **Down**  button on the keypad until the LCD screen displays '**Bottom Limits**'
- Press the **Run**  button to select 'Ok' and enter into the bottom limit sub-menu
- With the screen displaying, '**Select Bot Limit**' press the **UP**  / **Down**  button to cycle through to the appropriate bottom limit to be set
- Press the **Run**  button
- Open the right guard

- Using an object, carefully move the test media to the side of the blade (refer to the picture for an example)
- Close the right guard again
- With the screen displaying, '**Set Bot Limit 1**' reposition the blade clamp using the **Up** / **Down** buttons until it is in the required end position
- Press the **Run** button to save the current bottom limit position
- Press the **Retract** button to return to the main setup menu
- Press the **Down** button on the keypad until the LCD screen displays '**Top Limits**' the top limit sub-menu
- Press the **Run** button to select 'Ok' and enter into the top limit sub-menu
- With the screen displaying, '**Select Top Limit**' press the **Up** / **Down** button to cycle through to the appropriate bottom limit to be set
- Press the **Run** button to select 'Ok' and enter into the required top limit's settings
- With the screen displaying, '**Set Top Limit 1**' reposition the blade clamp using the **Up** / **Down** buttons until it is in the required start position
- Press the **Run** button to save the current top limit position
- Press the **Retract** button to return to the main setup menu

Note: as a minimum, Bottom Limit 1 and Top Limit 1 should be set.

3. OPERATION

3.1. Basic Operations

3.1.1. Saving Tests

Once you have run a test, you will be asked if you wish to save the test. If so, click “Yes”.

If you want to change any test details after the test has been completed, save it, and locate the test in ‘view tests’. Right click the test and select Edit (this functionality must be enabled in admin settings). See section 5.2

3.1.2. Running Multiple Tests

It is possible to run multiple consecutive tests for a single blade when the KST is connected to a PC / laptop.

- Click on "Settings" on the menu bar
- Under “Test”, Check the "Multi-Test Mode" box
- Type in the number of tests per run required

You can then prepare and run tests normally. The KST will run your designated number of tests, saving each one, and then stop.

3.1.3. Setting Score Cut-Offs

A sharpness acceptance level can be set to colour code the parameters of sharpness. The software will display a colour coded window that indicates GREEN if the results are within the acceptance levels or RED if the results are outside the acceptance limits.

- Click on "Settings" on the menu bar
- Ensure the Admin settings have been unlocked (admin password may be required, which is ‘Adm1n’ by default)
- Under “Score Cut-Offs” set the desired scores for: sharp, very sharp, extremely sharp
- Scores will now be displayed with relative colour coding

3.1.4. Pausing or Stopping Tests

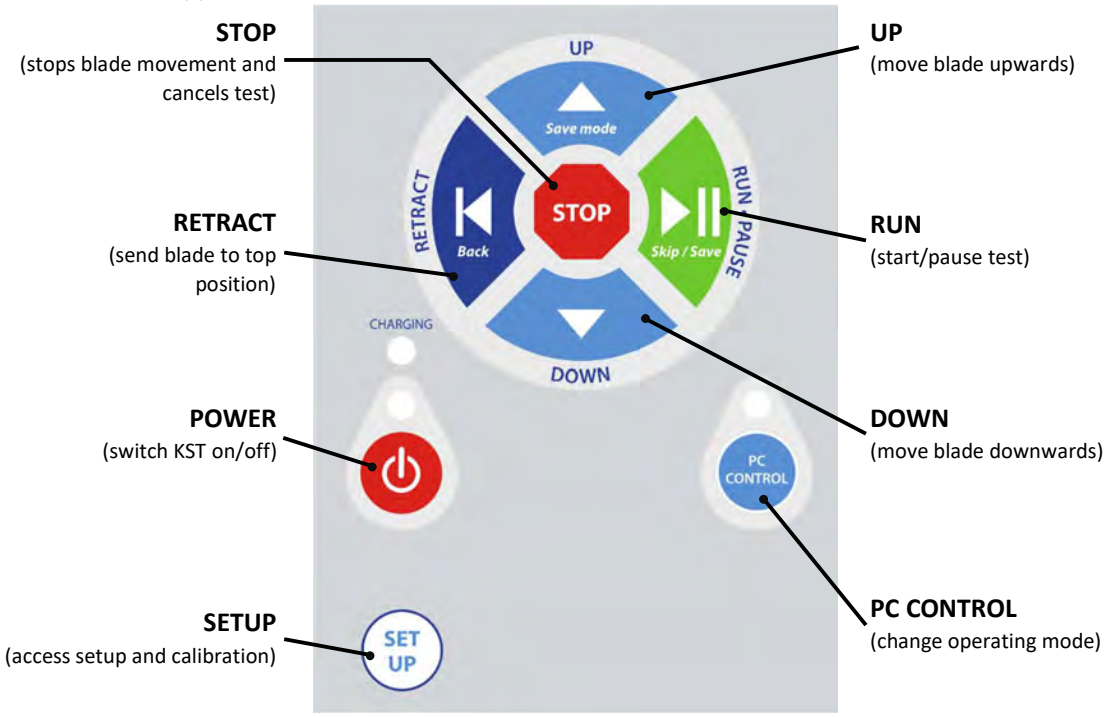
The KST models all allow you to pause and restart tests at any time during an analysis.

This is particularly useful for blades with notches in them (e.g. mechanical slicing blades) and/or blades with intentionally dull tips that require a slot to be pre-cut into the test media before an accurate analysis can be conducted.

- To pause or resume a test at any point, you can press the Run/Pause  button on the keypad
- To stop a test at any point, you may press the Stop 

button on the keypad

3.2. Keypad Functions



3.2.1. *Switching the KST on / off*

Press the **Power** button on the keypad

3.2.2. *Moving Blade Manually*

Press the **Up** or **Down** button on the keypad to position the blade clamp.

The clamp will stop once you release the Up or Down button.

3.2.3. *Stopping the blade clamp*

Press the Stop button to stop motion at any time.

3.2.4. *Running a test*

Press the **Run** button

The test will run automatically, stop and then calculate and display the resulting score on both the LCD (text) display and the LED (lights) display.

3.2.5. *Retracting the blade clamp*

Press the **Retract**  button. The KST200e/300e will retract the blade to its top position.

3.2.6. *Switching between Auto and Local operating mode.*

Press the **PC Control**  button on the keypad to move between Local and PC Control modes.

The Auto Mode indicator will light up when the KST200e/300e is in PC Control Mode.
PC Control mode allows the KST to be controlled by the PC Software.

3.2.7. *Advancing the media*

Simultaneously press the **Up**  and  **Down** buttons on the keypad to advance the media.

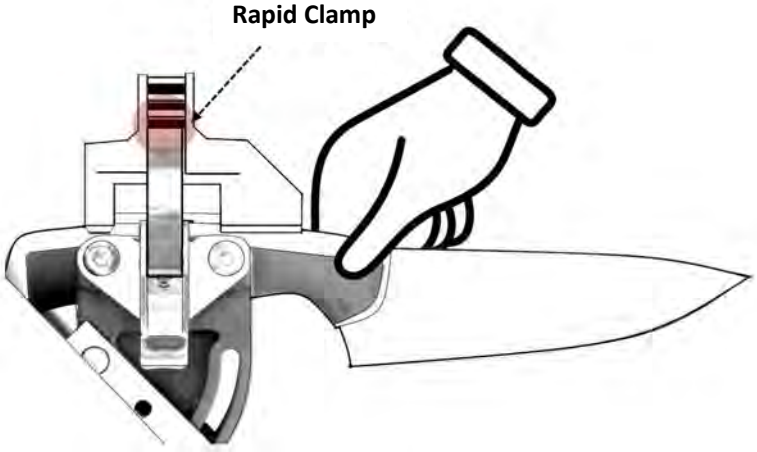
3.3. Rapid Clamp

 **Wear appropriate cut-resistant or chain mail gloves when loading and unloading blades!**

3.3.1. *Clamping the Blade*

Note: For safety reasons, knives should always be loaded holding the knife's handle from the top.

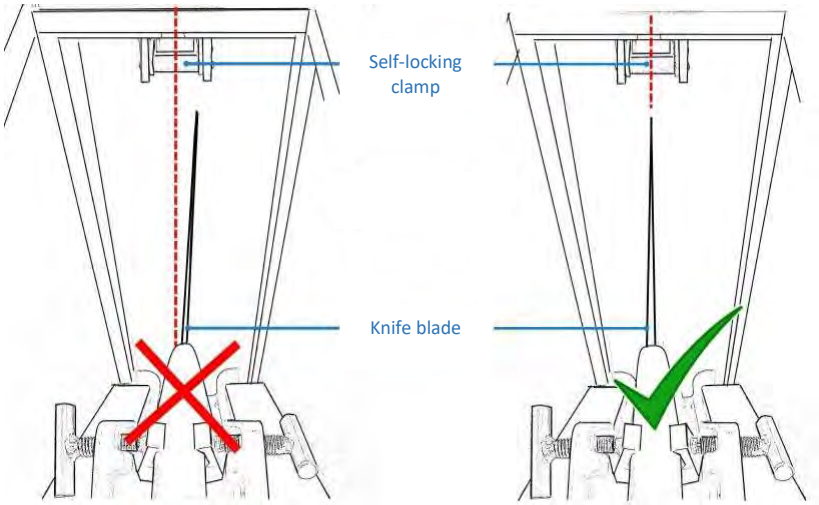
Rapid Clamp



- Ensure the blade is firmly clamped, by choosing the correct hook
- If you require a custom clamp for specialist blades, contact us at support@anago.co.nz for additional clamping options.

3.3.2. *Aligning the Blade*

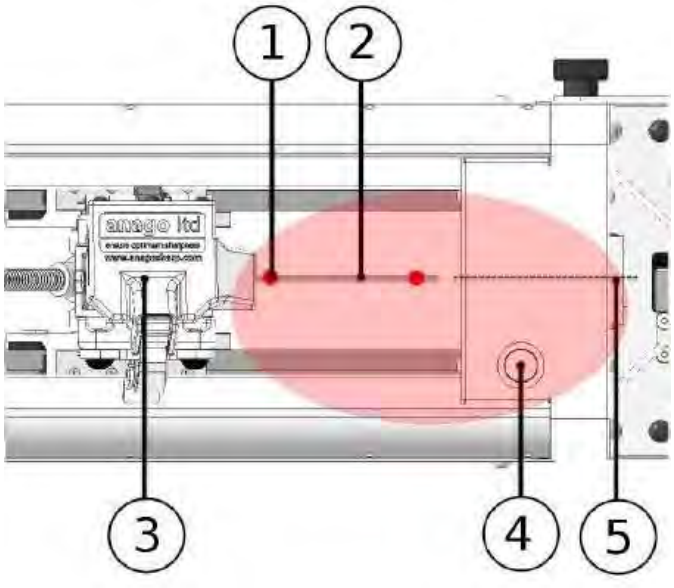
Align the blade so that the entire length is in line with the centre of the test media.



3.3.3. *Laser guiding for Alignment*

- Press the silver button at the top of the KST to activate the two laser beams
- When the blade is properly aligned, the lasers will shine directly onto the top of the blade

Pressing the laser button will turn the lasers on and pressing it again will turn them off.

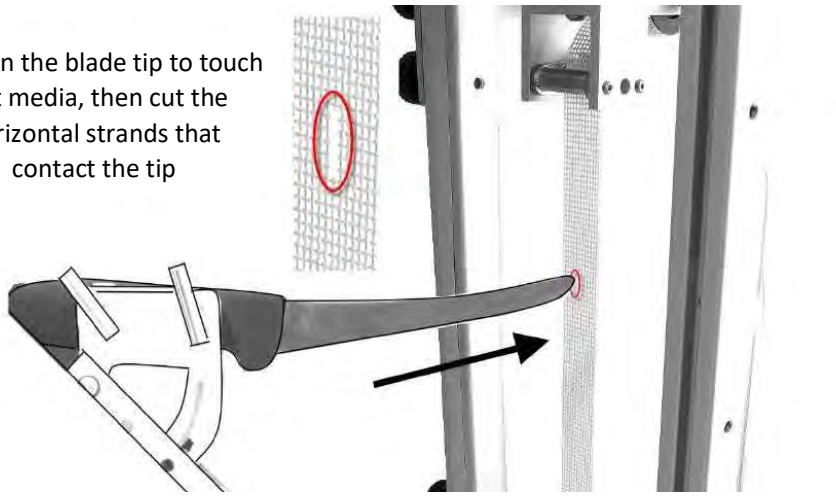


1. Laser Beam
2. Knife Blade
3. Rapid Clamp
4. Laser Button
5. Top Self-Locking Clamp

3.3.4. *Blades with Blunt tips*

The recommended method for testing blades with intentionally blunt tips is to clamp the blade, then manually cut the portion of the test media which will be struck by the tip. This will allow the knife to travel through and perform a test as usual.

Position the blade tip to touch test media, then cut the horizontal strands that contact the tip



3.3.5. *Scalpels and blades without handles*

Scalpels and short blades that don't have a handle generally benefit from the use of a special clamping attachment developed specifically for accurate and quick clamping of these types of blades.

Please contact us at support@anago.co.nz or sales@anago.co.nz for more information on this and other specialist clamping options.

3.4. Running a Test

3.4.1. *Running a Sharpness Test without a PC / Laptop*

The KST allows you to run a sharpness test without a PC attached. It also contains an on-board battery for portable testing.

It calculates the score locally and displays the results on the LCD and LED screens.

How to run a test without a PC / Laptop

- Clamp the blade to be tested in the KST blade clamp
- Pull the bottom end of the test media and clamp it with a 2.00-2.30kg force reading on the LCD display. The test must begin within this range.
- Press the **Run** button on the keypad

  The results will be displayed on the Anago KST. Unclamp the test media before retracting the knife.

3.4.2. *Running a Sharpness Test with a PC / Laptop*

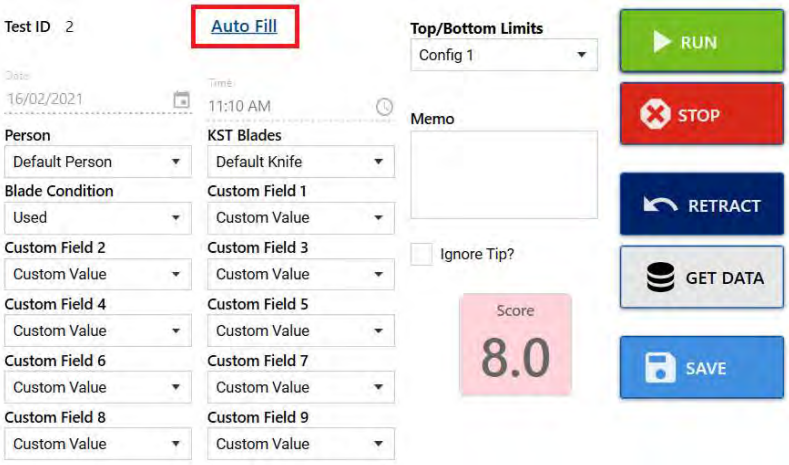
Running a sharpness test with a PC / laptop allows you to save, view and analyse data. In addition, it allows you to run multiple tests on the same blade or to use the accept / reject mode.

How to run a Sharpness Test with a PC / Laptop

On the Anago KST:

- Clamp the blade to be tested in the KST blade clamp.

- Press the **PC Control**  button on the keypad to switch to PC Control Mode – the Auto Mode indicator will light when the KST is in PC Control Mode
- Open **AnagoSharp** software
- Select "Home" on the menu bar
- Click the "Auto Fill" button to automatically fill the test information with the information from the most recent test using the drop-down lists.



- Change any field as required. Use the drop-down lists to select previously entered data.
- Pull the bottom end of the test media and clamp it with a 2.00-2.30kg force reading on the LCD display. The test must begin within this range.
- Start the test by clicking the "Run" button, the test will run.
- The test can be stopped at any time by clicking the "Stop test" button.
- A screen will pop up asking you if you wish to save the test. **Click "Yes" to save the test**.
- Unclamp the test media before retracting the knife.

4. TEST RESULTS

4.1. PC Mode

Term	Meaning
Anago Score	The Anago Score provides a measurement scale that can be used to compare sharpness levels across facilities, cities, countries, continents and the world. The Anago Score has two components: • The objective score that is applied to each measured point along the edge of a blade. The average score for the entire blade length. **Recommended minimum:** ○ 8.0 for food processing blades ○ 9.0 for scalpels
Cutting Force	The force required to cut the test media at any given point along the blade
Distance from Tip	The distance from the tip of the blade to the position being discussed
Peak	The top of each jagged portion of the Raw Data graph
Preload	The tension applied to the test media when the test starts – consistent preload for each test is very important in ensuring consistent results

Score vs. Effort

The table below shows the change in effort required to use a knife/blade relative to a knife that scores 8.0 on the Anago Sharpness Score.

As can be seen, a small change in Anago Score means a large change in cutting effort. In this table, a score of 8.0 has been compared to higher and lower scores.

Anago Score	Relative Force Required to Cut
10	0
9.7	0.1
9.5	0.3
9	0.5
8.5	0.66
8 (ideal)	1
7.5	1.33
7	1.8
6.5	2.5
6	3
5.5	4
5.0	5.5
4.5	7
4.0	9
3.5	13
3.0	18
2.0	42

4.1.1. Viewing Results

The AnagoSharp Software enables you to view your test results in three ways:

- **Score** shows the score profile along the length of the blade.

- **Raw** Test Data shows the data as it was recorded by the KST. It shows the actual forces measured by the Anago KST.
- **Clean** Test Data presents the analysed forces after normalization, i.e. a peak analysis of the data with the initial flat (prior to the blade hitting the media) removed.

Each of these can be found on the corresponding tabs: “Raw”, “Clean” and “Score” in the “View Tests” option. **Note:** A set of results needs to be selected and ticked for this function to work.

- Click the relevant table to display different graph types.
- It is possible to zoom in on results for closer inspection: Drag / draw a box on the graph to zoom in on those results. To return to full view, double-click on the chart.

Score

This is the most common way of viewing the results of a sharpness test.

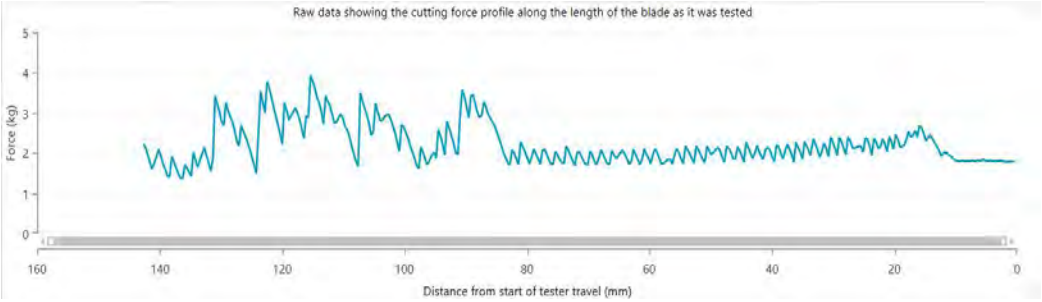
This mode shows you an overall sharpness score out of 10 for your blade and produces a profile of sharpness. Each section of the blade is categorized under sharpness zones on the vertical axis.

This view is also useful when layering tests on top of each other for a direct comparison of sharpness, or to track an individual blade’s performance over time.

Note: the tip of the blade is on the right-hand side of the graph. This can be changed in the software settings.

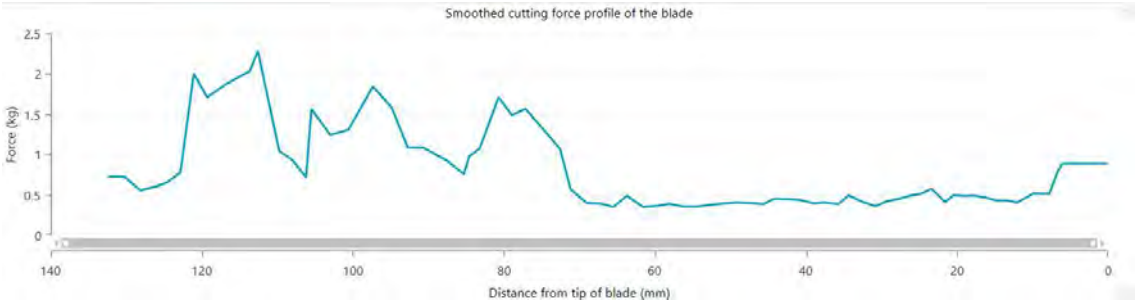
Raw Test Data

The "Raw" graph displays the actual forces and distances measured during the test. It is useful for showing dull or damaged portions of the blade, and for troubleshooting test issues.



Clean Test Data

The “Clean” view shows a running average of the cutting force against distance from the tip.



4.2. Stand-Alone Mode

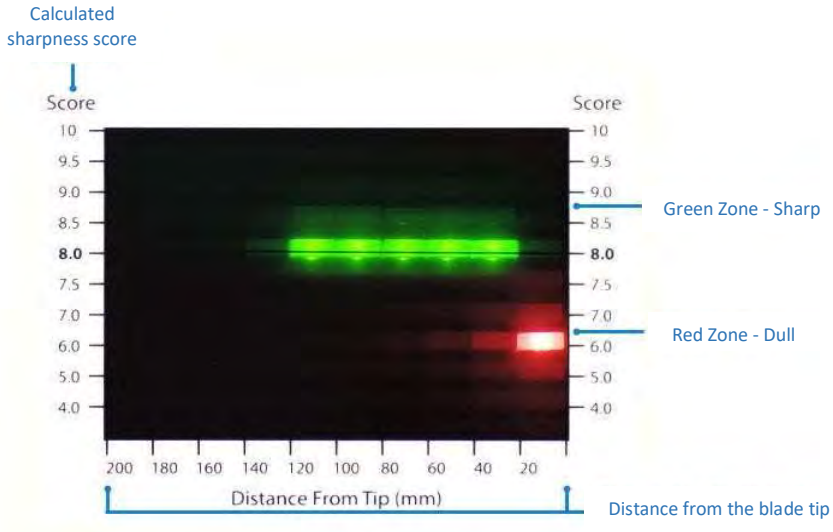
4.2.1. LCD Display

- Displays the model/serial number on start-up
- Displays the operating mode (manual, PC Control)
- Displays the overall sharpness score
- Displays the force applied to the load cell (in kilograms)
- Displays the test mode (sharpness, wear)

4.2.2. LED Light Array

The LED array consists of red and green lights that display the sharpness profile. The green LEDs represent a score above 8.0. The sharpness profile is only displayed on the LEDs if a test has been run without a PC.

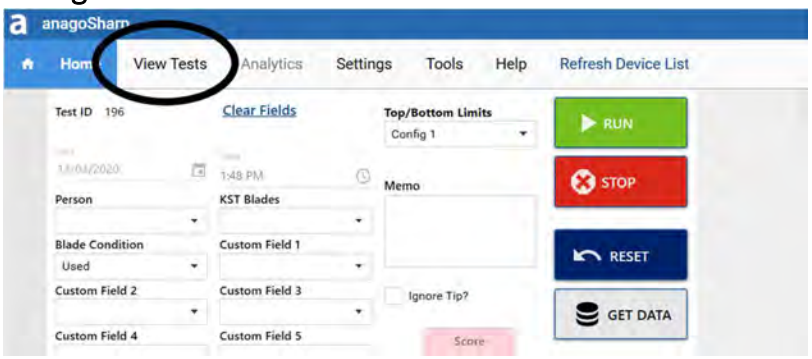
Each section of the blade is divided into blocks of 20mm lengths from the tip to the end of the test. All scores in each block are averaged and the corresponding LED is lit.



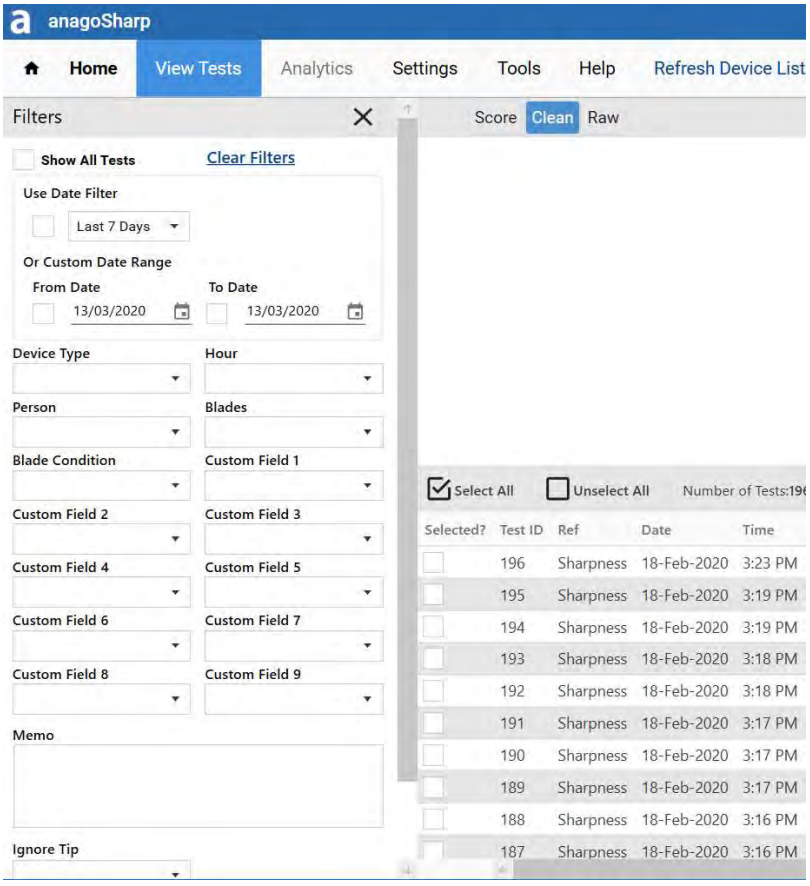
A score of 8.0 or above is the recommended minimum score for a blade used for professional food processing.

5. DATA MANAGEMENT

5.1. Viewing Previous Results



- Select “View Tests” on the menu bar
- Check “Show All Tests”, or select an individual test result



- Choose the criteria you want to use to filter down the list of tests. You can filter the tests by using the drop-down arrows to select values from those stored in the database.
- The list can be ordered by clicking on the title of any of the columns
- Tick the tests that you would like to see graphed

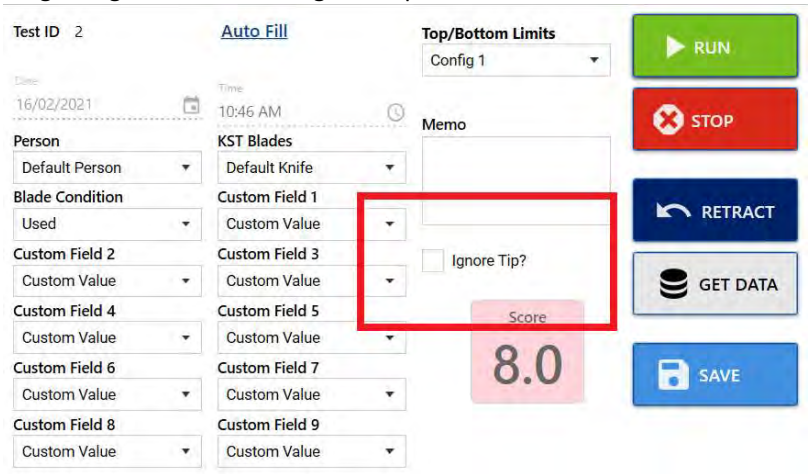
The selected test results will be shown.

5.1.1. *Ignoring the Score at the Tip of the Blade*

Some processing tasks require the tip of a blade to be blunt. In this case you would want the KST Sharpness analyser software to ignore the force at the tip of the blade when calculating score.

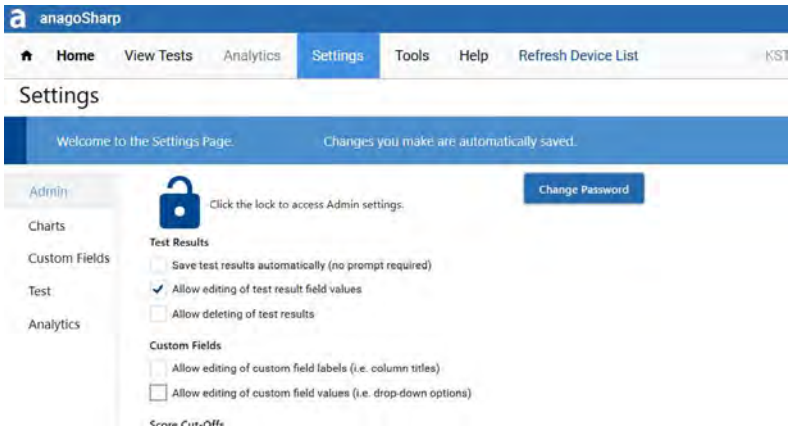
To ignore the tip in the score calculation:

- Before beginning the test, select 'Ignore Tip' on the home screen

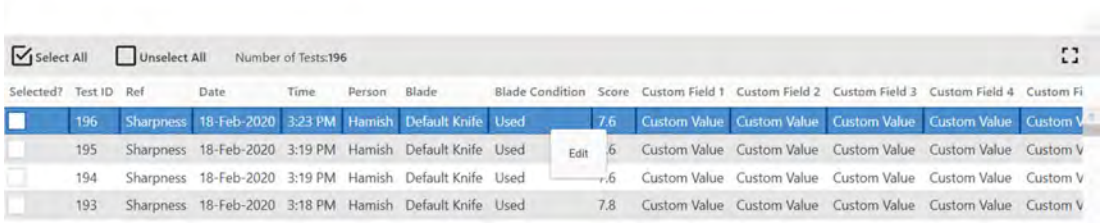


If the test is already saved, and you would like to change whether the tip force is included in the score calculation:

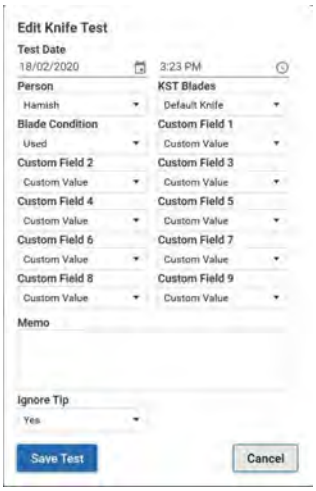
- Select "Settings" and tick "Allow editing of test result field values



- Right click on the test you wish to change and click "edit"

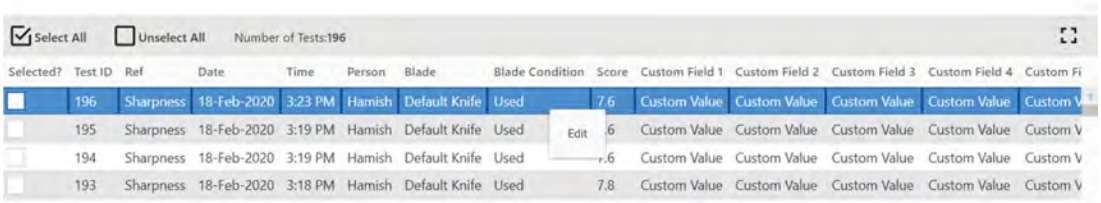


- Select "Ignore Tip". Here you can alter any of the saved test data.

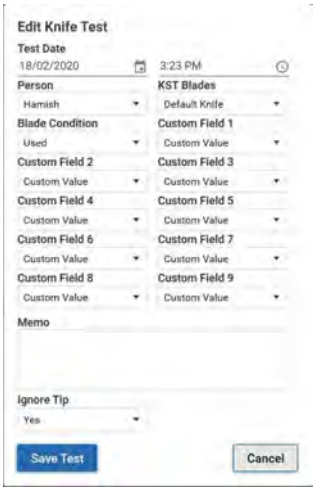


5.2. Editing Test Information

- Right click on the test you wish to change and click edit



- Select “Edit”
- From this menu, any saved test data (such as custom fields) can be edited

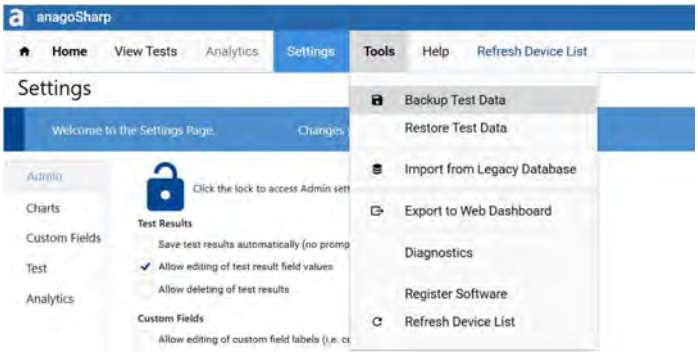


- Make the required changes
- Click “Save Test”.

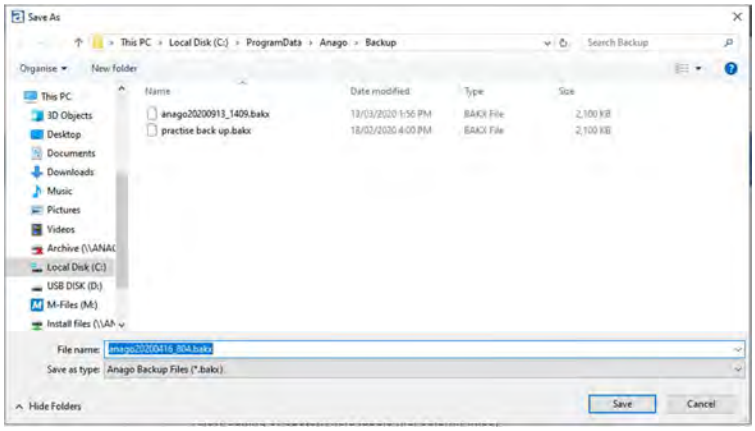
5.3. Backing up, Restoring and Importing Data

5.3.1. Backing up and Restoring Files

- Select “Backup Test Data” or “Restore Test Data” under “Tools” on the menu bar



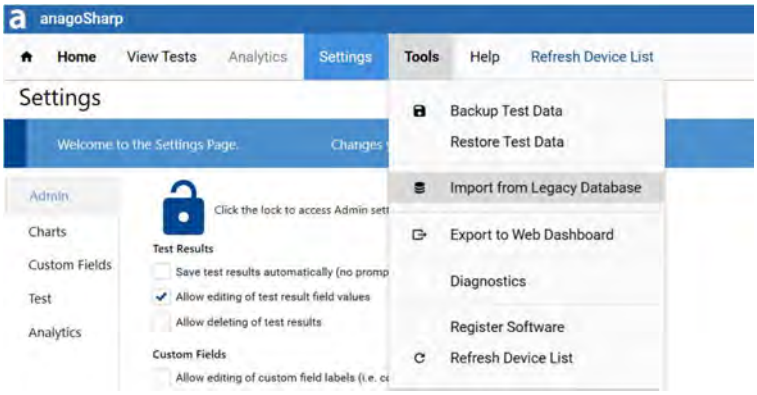
- Backup: Navigate to the desired folder location and name the file
  Restore: Navigate to the backup location and select the file



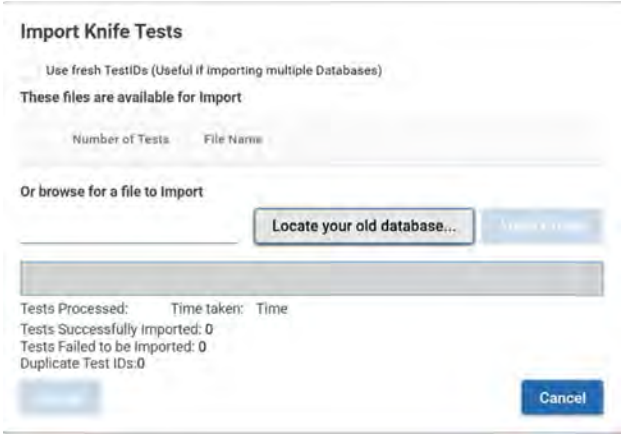
- Backup: Click “Save”
  Restore: Click “Open”

5.3.2. Importing Data

- Click on “Import from Legacy Database” under “Tools” on the menu bar



- Click “Locate your Old Database”



- Open the file you wish to import

The import will occur automatically.

6. TROUBLESHOOTING AND MAINTENANCE

Please contact support@anago.co.nz if you require technical support.

6.1. Machine Maintenance

The KST is a sensitive measuring device and **calibration** is therefore a very important aspect of its regular maintenance.

Calibration is recommended:

- On a weekly basis
- After testing dull blades
- After transportation of the sharpness tester from one location to another.

In addition, the drive screw on the motor requires regular lubrication. Check the lubrication and add more lubricant if required, but no less frequently than monthly. Food grade lubricant is preferable due to the proximity of the drive screw to the knife blade.

If the battery charging light does not glow when the KST is plugged in and the power socket is switched on at the wall, check the fuses that are installed below the KST power socket (non-water-resistant models only). The fuse may be loose or require replacement. The battery will degrade over time and may need replacing if it cannot hold charge or a ‘Low Battery’ error appears.

The KST switches itself off after a few minutes of inactivity to minimize the risk of the battery discharging fully.

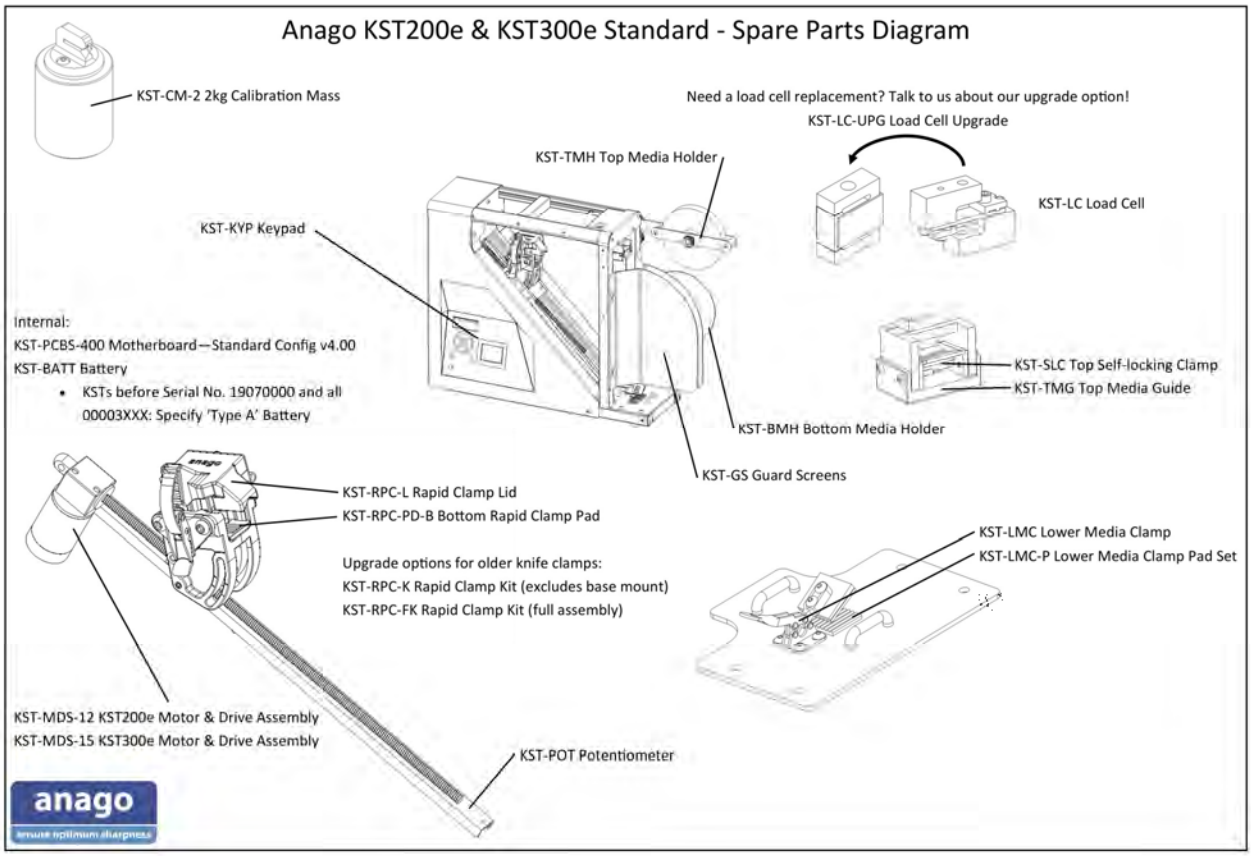
6.2. Troubleshooting

Please reach out to us at support@anago.co.nz to help troubleshoot issues with your KST. We appreciate any pictures and videos you can provide.

There are some common problems that can be solved with a few basic troubleshooting steps

- Check the machine is properly calibrated – see section 2.5 Calibration
- Confirm that the test media has been loaded correctly – see section 2.2.2 Loading Test Media
- Inspect – are any parts missing or damaged?
- Test the bottom media clamp actuator – in anagoSharp, go to Tools > Diagnostics > Check Actuator Clamp. If there is no motion when prompted, the part may need replacing
- While the clamp is closed, check that you cannot pull any test media through it with 5kg/10lb of force. The same goes for the top self-locking clamp.

6.3. Spare Parts



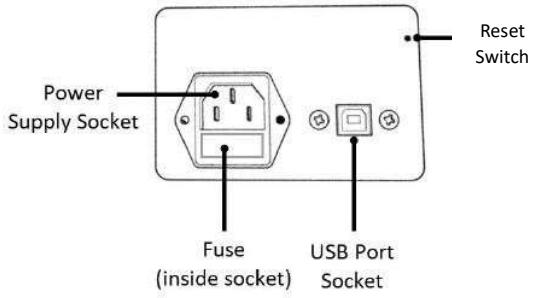
Spare parts can be ordered from Anago via email (sales@anago.co.nz). You can also request a price list. Below is the spare parts diagram for KST Auto

6.4. Software Updates

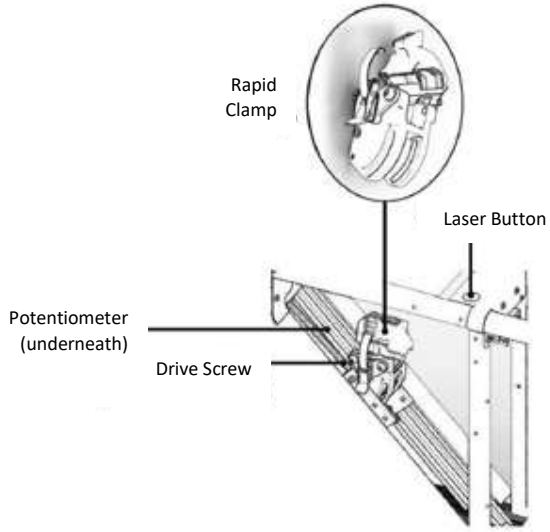
Your KST comes complete with firmware and software updates downloadable from an internet link. To request access to the link, email us at support@anago.co.nz. The anagoSharp software will automatically update.

6.5. Machine Components

6.5.1. Side Connections



6.5.2. Blade Clamp and Linear Slide.



6.6. Product Specifications

	KST 200e	KST 300e
AC Line Voltage	100-240Vac, 50/60 Hz 1.8A	100-240Vac, 50/60 Hz 1.8A
Dimensions	79cm(L) x 26cm(W) x 49cm(H)	95cm(L) x 26cm(W) x 49cm(H)
Weight	20kg	24kg
Fuse	5A, M205, Fast Blow	5A, M205, Fast Blow